THE UNIVERSITY OF CHICAGO

DEPARTMENT OF ECONOMICS

ECON 36700 - ECONOMICS OF EDUCATION

Spring, 2021

Problem Set 1

Instructor: Michael Dinerstein

Instructions.   The problem set is due on April 20th. You may work together and turn in one problem set per group. You should submit a document with your results along with your code files by e-mail directly to the instructor.

1. Estimating value added

In this problem, we estimate teacher value added following Chetty *et al* (2014, AER), CFR-I. They propose the following model for test scores:

$$y_{it} = x'_{it}\beta + \mu_{jt} + \varepsilon_{it}$$

where y_{it} denotes the test score of student i in year t, x_{it} is a vector of student and school characteristics, μ_{jt} is teacher value added and ε_{it} denotes idiosyncratic shocks to test scores, which may contain for instance class shocks. The object of interest is μ_{jt}, which can be estimated using a student-level panel dataset including test scores, student covariates and assignment of teachers to students.

    a. Describe in detail two relevant differences between the approach proposed by CFR-I and previous approaches adopted in the literature (e.g. Kane, Rockoff, and Staiger 2008, Jacob, Lefgren and Sims 2010).

    b. Why do teacher moves across schools within the sample period aid value added estimation?

    c. Using a similar reasoning, why not exploit student moves across schools for value added estimation?

    d. Using the dataset `va-data.csv`, estimate teacher value added using the methodology proposed by CFR-I. The dataset covers eight years of data. It includes school, class, teacher and student identifiers, along with students characteristics and standardized test scores. Outline each of the steps in the estimation procedure and discuss how are potential concerns regarding value added estimation addressed. Briefly discuss your results.[1]

---

[1]Implementing this procedure using the Stata package `vam.ado`, written by Chetty *et al*, would take you only a few minutes. However, we encourage you to code the procedure yourself, so as to thoroughly understand all its details. The mentioned package can actually serve the purpose of checking your results.

e. How is bias in teacher value added estimates defined in CFR-I? Explain their definition and compute bias in your estimates of teacher value added. Discuss your results.

f. How relevant is it to account for drift in value added in this data? Compute the implications of not doing so by comparing your estimates from (d) with estimates that do not account for this aspect.

2. Chetty *et al* and Rothstein exchange on value added

An interesting exchange followed CFR-I. A comment by Jesse Rothstein and a response by Chetty *et al* are now forthcoming in the AER. This question focuses on that exchange. Be precise in your exposition.

a. One of Rothstein's main concerns is related to the quasi experiment proposed in CFR-I. Explain the concern in detail and describe what he finds in his empirical application.

b. How do Chetty *et al* answer to this concern? Why could placebo effects of teacher value added on past test scores be found even if the research design in CFR-I was valid?

c. Propose a hypothetical research design that would allow you as a researcher to circumvent this discussion.